

Application Serial No. 10/826416
Amendment dated August 8, 2006
Reply to Office Action dated May 8, 2006

Amendments to the Specification

Please replace the paragraph beginning on page 3, at line 14, with the following amended paragraph:

Copending U.S. Patent Application No. 10/809,115, entitled MULTI-STAGE BOILER STAGING AND MODULATION CONTROL METHODS AND CONTROLLERS, published as US 2005-0230490 A1, (Atty. File No. 1161.1126101) is incorporated herein by reference. Copending U.S. Patent Application No. 10/809,116, entitled COLD WATER BYPASS AND FIRING RATE CONTROL, now U.S. Patent No. 6,904,874, (Atty. File No. 1161.1132101) is also incorporated herein by reference. These patent applications illustrate some interface and control methods for individual and multi-stage boiler systems. U.S. Patent No. 6,536,678 and 6,694,927 illustrate several example boiler control systems and methods, and are also incorporated herein by reference.

Please replace the paragraph beginning on page 5, line 17, with the following amended paragraph:

If the temperature sensed by the bypass temperature sensor 26 is too low, condensation may occur in the primary heat exchanger 14. Such condensation may occur when the bypass temperature falls below one-hundred thirty degrees Fahrenheit (fifty-five degrees Celsius), and some times blow around one-hundred twenty degrees Fahrenheit (forty-nine degrees Celsius). Such condensation in the primary heat

exchanger can, in some cases, damage the primary heat exchanger 14. As such, when the bypass temperature sensor 26 senses a temperature that is approaching a predefined bypass temperature limit, the bypass valve 20 may open to a greater degree to allow heated output water to feed back to the return flow and warm the temperature sensed at the bypass temperature sensor 26. If the bypass valve 20 is already fully open, the firing rate of the boiler may also be adjusted to increase the heat output of the boiler, and thus the temperature of the water that is fed back to the return flow. Copending U.S. Patent application number [[_____]] (~~Atty. Docket No. 1161.1132101~~) 10/809,116, entitled COLD WATER BYPASS AND FIRING RATE CONTROL, now U.S. Patent No. 6,904,874, which is expressly incorporated herein by reference, illustrates various methods for overcoming low bypass temperatures and avoiding condensation in the primary heat exchanger 14.

Please replace the paragraph beginning on page 8, line 1, with the following amended paragraph:

In the illustrative embodiment, the temperature control block 156 sends a percent error or demand signal to an analog stage control block 158 and a stager block 160, as shown. The analog stage control block 158 generates a percent demand signal that is sent to the stager block 160 as well as a system derivative action block 162. The stager block 160 determines how many stages should be called, and determines whether to add or remove stages in response to the error signal. Some illustrative staging methods are

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shown in copending U.S. Patent Application No. 10/809,115, ~~application no.~~

[[_____]] entitled MULTI-STAGE BOILER STAGING AND MODULATION
CONTROL METHODS AND CONTROLLERS, published as US 2005-0230490 A1
(~~Atty. File No. 1161.1126101~~).

Please replace the paragraph beginning on page 9, line 15, with the following amended paragraph:

In the illustrative embodiment, the network interface block 168 in boiler stage 152 is coupled to a stage [[on/ff]] on/off network mode block 170 and a modulation rate control block 172. The stage on/off network mode block 170 controls whether the boiler stage 152 is on or off. The stage on/off network mode block 170 also provides a signal to the flame safety control block 174, which in turn operates and monitors an ignition source 176 and a gas valve 178.

Please replace the paragraph beginning on page 12, line 20, with the following amended paragraph:

In one embodiment, as explained in co-pending U.S. Patent Application No. 10/809,116[[_____]], entitled COLD WATER BYPASS AND FIRING RATE CONTROL, now U.S. Patent No. 6,904,874, the bypass temperature control may include or operate in parallel with an inlet temperature sensor. In such a method, if the inlet temperature drops below a predefined level, then the firing rate may be raised right away,

rather than waiting for the bypass valve to open completely. The call for increased firing rate, as further explained above and below, may override a derivative action call for reduced firing rate.

Please replace the paragraph beginning on page 17, line 1, with the following amended paragraph:

In the illustrative embodiment, logic 320 receives signals from each of the derivative action block 314, cold water draw control 322, and modulation control 324, and uses these signals to determine a firing rate demand to send to the VFD 326. As noted above, the cold water draw logic 322 may generate a call for increased firing rate to avoid condensation in a boiler. The modulation control 324 may be controlled in various ways. Some illustrative modulation control methods are shown in copending U.S. Patent Application No. 10/809,115 [[_____]] entitled MULTI-STAGE BOILER CONTROL STAGING AND MODULATION METHODS AND CONTROLLERS, published as US 2005-0230490 A1, which is incorporated herein by reference.